EFFECTS OF AGRICULTURAL PRACTICES ON THE DISTRIBUTION OF WESTERN HARTEBEEST *(Alcelaphus buselaphus)* IN OLD OYO NATIONAL PARK, NIGERIA

*Akinyemi, A. F.
**Kayode, I. B.
Department of Wildlife and Fisheries Management,
University of Ibadan, ibadan, Oyo State, Nigeria
*E-mail: *akinyemi_wildlife@yahoo.com*
**E-mail: *ifykay999@yahoo.com*

ABSTRACT

This study on the effect of agricultural practices on the distribution of Western Hartebeest was carried out in Old Oyo National Park, using Rapid Rural Appraisal (RRA), Participatory Rural Appraisal (PRA) methods and structured questionnaire to collect information. Animal census survey was also carried out in the park using line transect method to determine the distribution pattern of Western Hartebeest in Sites 'A' the core zones of the park without human activities, and site 'B' the park with human and agricultural activities. T distribution paired test, ANOVA and percentages were used for statistical analyses. The result revealed that there is no significant difference in the purposes of using fire but significantly differs in the distribution of Western Hartebeest in both sites. Therefore, conservation education and modern techniques of agriculture such as planting of hybrids with high yield quality, pest and disease resistance should be introduced to the farmers.

Key Words: *Agricultural practices, Western Hartebeest, Old Oyo National Park*

INTRODUCTION

Wildlife is an important component of savannah ecosystem and is dependent on the vegetation to thrive. The status and trend of wildlife will not be adequately considered without giving consideration to their habitats. Until the beginning of this century, tropical wildlife was reasonably undistributed and was considered to be balanced with traditional human activities, shifting cultivation and hunting with primitive tools such as traps, snares and flint guns (Asibey, 1976).

Ajayi (1986) asserted that towards the end of the last century and more pronounced during the first decade of the century, plantation agriculture particularly for cocoa, palm oil, and rubber were introduced to West Africa. This marked the beginning of large scale utilization and modification of tropical forest ecosystem. Habitat clearance and alteration are the most important single threats to biodiversity. Deforestation for timber trade, mining and oil extraction contributes to the irreversible habitat destruction.

Serious concerns exist about environmental and ecological degradation from modern agriculture (Freemark, 1995). Agriculture affects species diversity directly and indirectly leading to or beyond the bricks of extinction. The most important agricultural activity influences that have caused the extinction or endangerment of species are: (a) the effect of introduced predators, competitors or diseases (b) habitat loss or conversion. To check these threats, a culture of sustainable use of these resources to regenerate and to fortify the health of the earth must be propagated by man. It is in line with this that Nigeria National Park Services was established through Decree 46 of 1999 (now Act 46 of 1999) to pursue the conservation and balance development of our Nation's natural resources. This decree not only prohibits but also places legal restriction into the park. Despite these restrictions to the parks, significant number of enclave communities now lives inside and around the boundaries of the park and depend on the resources for their survival. Primary features of these people in the park region is wide spread poverty and illiteracy which is rarely conducive to conservation of natural resources (Lameed, 2005). Local people see park as imposed restriction on their traditional rights hence

conservation has no basis in their system. Legislation as a major tool of management of biodiversity has appeared unsuccessful in Nigeria due to hunger and starvation (Ayodele and Lameed, 1999).

Old Oyo National Park was chosen for this study in view of many farmers and cattle rearers that settle in the park region and its proximity to regions of extensive agricultural practices. The effect of unsustainable agricultural practices on conservation of the ecosystem of the park was studies so as to provide useful information to the management of the park for making the policies and plans to guarantee effective and efficient management to realise the aims for which the park was established. Therefore, the objectives of this study are to identify the level of agricultural encroachment into the park, evaluate the impact of agricultural activities on the ecosystem of the park, and to highlight the distribution of Western Hartebeest inside the park.

METHODOLOGY

The study was carried out in ranges of Old Oyo National Park. It has a total land mass area of 2,512 km^2 and located between latitudes 8^015` and $9^000$`N and longitudes 3^035` and $4^042$`E. The park is located in the northern part of Oyo State. It has five patrol ranges namely: Marguba, Sepeteri, Yemoso, Oyo-Ile and Tede, which Marguba, Sepeteri and Yemoso ranges were randomly selected for the study. The park is situated in a transition vegetation zones between mixed deciduous rainforest ecosystem and open savannah woodlands in the north (Adeola, 1995). The park is rich in many and different fauna and flora species.

The first aspect of this study was carried out by administering structured questionnaires on the villagers leaving close to the park, while the second aspect involved field survey. Forty scripts of structured questionnaire were administered in each of the three villages randomly selected among the 300 communities that fall within three ranges of the park. These three villages were chosen based on their geographical location within the five patrol ranges of the park.

Group interview was adopted to obtain broad sense of local view on some issues about the park which helped to discover problems and expectation related to conservation initiative. Rapid Rural Appraisal (RRA)

and Participatory Rural Appraisal (PRA) methods were also employed to attain significant success in gathering relevant information. Field survey was carried out to determine the distribution of Western Hartebeest in the park as affected by agricultural activities in and around the park by the villagers bordering it. The past experience gathered while working in the study area gave a background for the field survey. Hence, the following were predetermined to aid sampling procedure:

(a)   The areas of highest concentration of Western Hartebeest within the park

(b)   Two heterogeneous study sites were chosen, which are: Site 'A' - areas without the impact of agricultural practices and Site 'B' - areas with the impact of agricultural practices

(c)   Both dry and raining seasons were used for the sampling survey. Raining season sample collection took place from 26th July to 19th August 2008 while that of the dry season was 10th January to 14th February 2009; which was 25 days for each season.

(d)   Straight line transects of 3.2km were laid at each of the studied sites.

(e)   The transects were constructed along the zones and pegged at intervals of 50meters (Dunn, 1994) and vegetation cover allowance for edge effect was made to ensure accuracy.

(f)   The team of the survey was at the maximum of four persons to minimize noise making that could chase the animals away

(g)   At the beginning of each transect, survey records of the following standard items records were made: location, date, time at the beginning and end of the survey and weather.

(h)   Observation period along the transect was not longer than 10 minutes At each place of sighting the animals, the following information was recorded on the standard population data sheet:

i.   distance from the point of detection to the transect

ii.   sighting distance of the animal to the observer at the moment of detection

iii.   time of initial and final sightings

iv.   location of the observer along the transect

v. sighting angle
vi. height of the animal first detected
vii. activities and behaviour of the animals on the first detection (for example, grazing, running, resting etc.)
viii. categories of sighting group e.g. solitary etc
ix. types of habitat

Twenty five days census was made along each line transect in order to determine the accuracy of the result. A precision standard was used to determine the confidence limit. The precision of an estimate is 95% confidence limit expressed as the percentage of estimated mean, that is,

$$\text{Percentage of precision} \quad = \quad \frac{95\% \text{ Confidence limit}}{\text{mean number of group}} \quad X \quad 100$$

The 25 days transect counts were carried out between 6:30 a.m. and 1:00 p.m. in the morning and between 4:30p.m. and 6:00p.m. in the evening on a daily basis. This was done to determine the population structure, herd size composition and habitat utilization. Binocular 10×40 were used to determine the number, sex, relative age, structure, activity, vegetation type, tree composition as well as canopy and ground cover where the animals have been sighted. All these were also recorded in a standard sheet.

All data collected were subjected to appropriate statistical analysis depending on the nature of the study. Duncan's multiple range tests (1955) was used to draw conclusions on various parameters studied within both sites 'A' and 'B'. Relative density, percentages and ANOVA were used as statistical tools to analyse the data collected. Relative density was calculated using the formula:

$$\text{Group Relative Density} \quad = \quad \frac{\text{Group sighted}}{\text{Number of days X Total distance}}$$

$$\text{Total Individual Relative Density} = \frac{\text{Number sighted}}{\text{Number of days X Total distance}}$$

Testing for difference between population of Hartebeest in both sites 'A' and 'B'

$$\text{T}_y \, df = \frac{\pi A - \pi B}{\frac{\sqrt{s^2 d}}{n}}$$

RESULTS AND DISCUSSION

Table 1: Educational background of the respondents

Level of education	Frequency	Percentage (%)
Primary Education	10	8.3
Secondary Education	20	16.7
Tertiary Education	0.0	0.0
No formal Education	90	75
Total	120	100

Source: Survey, August, 2008 - February, 2009

From the survey, it was observed that most of the rural dwellers living around the park areas are illiterate; a few of them have secondary education while an insignificant number has primary education. And since education is a key to knowledge, the majority of the respondents could not appreciate the importance of the park. They exploit and encroach into the park without appreciating the consequences of their inimical actions. A few percentages of educated villagers dwelling around the park have no influence on the community as regards conservation of biodiversity. This is in support of Lameed (2005) that the primary features of people living in the park region are wide spread poverty and illiteracy rarely conducive to conservation of natural resources.

Table 2: Location of the farms of respondents to the park

Location of Farms	Frequency	Percentage (%)
Park boundary	42	35
Close to the park boundary	36	30
Inside the park	24	20
Far from the park	18	15
Total	120	100

Source: Survey, August, 2008 - February, 2009

The level at which farmers encroach into the park on the basis that there is no clear-cut boundary demarcation is represented on Table 2. It was revealed that some of the farmers have their farms around the park boundary, some close to the park boundary, while some of them have theirs located inside the park (that is, they have encroached into the park). Only

few of the farmers have their farms far from the park. This shows that the activities of most of the farmers around the park have effect on wildlife composition of the park; some of the farmers have encroached into the park and altered the habitat which is very crucial to the ecological requirements of the Western Hartebeest. This agrees with Lameed (2005), that the alteration of habitat in Ghashaka-Gumti National Park threatens the survival of the primates.

Table 3:   System of cultivation of land by the farmers

System of land clearing	Frequency	Percentage (%)
Use of fire	39	32.5
Human labour	48	40.0
Tractor	33	27.5
Total	120	100

Source: Survey, August, 2008 - February, 2009.

The various systems of land preparation for planting employed by the farmer respondents are presented on Table 3. The use of fire, human labour and tractor are the systems of land preparation for planting employed by the various farmers. Since fire and human labour have higher percentages than the use of tractor, hence slash and bush burning land preparation are common. The implication of this is that when farmers set fire on the dried fuel matter, the wild fire uncontrollably spreads to the park and destroys the ecosystem.

Table 4: The reasons for using fire by the various Respondents

Uses of fire	Frequency	Percentage (%)
Hunting purposes	30	25
Clearing farmlands	48	40
Gathering honey	24	20
Regenerating new grasses	18	15
Total	120	100

Source: Survey, August, 2008 - February, 2009

There is no significant difference (P >0.05) in the purposes of using fire by the respondents (Table 4). The implication is that fire is extensively used for hunting, clearing farmland, gathering honey and regeneration of fresh grasses. The indiscriminate bush burning has being giving the protected area's managers sleepless nights. Hunters, farmers and herdsmen use fire for their selfish ends. The Bororo and Hausa Fulani's herdsmen set the park vegetation on fire which causes wild fire and devastate large portion of the park's vegetation between February and April every year.

Table 5:   Relative density of Western Hartebeest at both sites in Old Oyo National Park

Transect	Group	Isolated individual	Population per mean individual
A	0.08	0.05	0.48
B	0.06	0.05	0.26
Total	0.14		0.74
Mean	0.07		0.37

Source: Survey, August, 2008 - February, 2009.

Table 5 shows the relative density of Western Hartebeest at both sites 'A' and 'B'. Site 'A' contains higher mean population relative density than site 'B'. The mean isolated individuals at both sites are the same. T distribution paired test on the distribution of both transects show that there was a significant difference (P<0.025) between the two populations. Therefore, the population in site 'A' is greater than that of site 'B'. The mean relative density from the two sites is the same Hartebeest per kilometre.

CONCLUSION AND RECOMMENDATIONS

In old Oyo National Park, most of the rural dwellers living around the park areas are illiterate (75%), therefore conservation has no basis in their system. Villagers living around the park visit the park regularly, they are very much aware of the potentials of the park. Therefore, these rural people depend on the park resources for their livelihood; they farm around the park boundaries and inside the park with disregard to park laws and

regulations. The effects of farm encroachment are habitat alteration, loss of genetic diversity, displacement and local migration of wildlife species. Animal population therefore tend to concentrate in the core zone of the park where they can enjoy better protection and undisturbed ecosystem.

Therefore, this research work establishes the fact that in the core area of the park, the population density of Western Hartebeest is 0.08 groups per kilometer as against 0.06 in the other parts of the park. This undisturbed zone of the park, cover areas between Ibuya and rivers Ogun, Iwawa, Ayinta,Ohu and Oope. The disturbed areas of the park cover areas between the park boundary and Oyo-ile relics, river Tessi, Garba and Iwa up to Bokolori, Banin, Bolounduro, Apata Oloko, Abaja, Gbeu and Ahunbado. In order to minimize the problem of agricultural encroachment by the villagers around the park and to enhance park protection and conservation activities by the management, it is recommended that modern techniques of agriculture such as planting of hybrids with high yield quality, pest and disease resistance should be introduced to the farmers in the support zone of the park to prevent them from encroaching into the park in search of fertile land; since majority of the rural dwellers are illiterates, conservation education in term of extension service should be carried to them so as to imbibe the culture of conservation for sustainable development, park boundaries should be clearly demarcated to guard against the unusual excuses of park encroachment for no clear-cut boundary demarcation.

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